WHAT IS CLAIMED IS:

1.   1.   A system for effectuating at least one protocol
2. layer of a protocol stack operable to implement a high
3. speed communication link at a network node, comprising:
4.   an input event structure including at least a
5. service access point (SAP) and a connection identifier
6. (CID) associated with a protocol layer service involving
7. a select service user layer and service provider layer
8. combination for a particular connection link;
9.   a context switch and controller block operable
10. to retrieve latest state-specific context information
11. from a context storage area based on said SAP and CID;
12. and
13.   a   generic   state   logic   program   structure
14. operable to process at least a portion of said input
15. event structure based on said latest state-specific
16. context information to generate next-state context
17. information and at least an output event vector including
18. at least one SAP and at least one CID associated with a
19. select destination point to which said next-state context
20. information is to be routed, wherein said next-state
21. context information is operable to be stored in said
22. context storage area based on a storage SAP and CID
23. provided in said input event vector.

1   2.   The   system   for   effectuating   at   least   one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 1, further comprising a state input queue
5   structure and a state output queue structure operably
6   disposed between said generic state logic program
7   structure and said context switch and controller block
8   for facilitating information flow therebetween.

1   3.   The   system   for   effectuating   at   least   one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 2, further comprising a plurality of state
5   registers operably disposed between said generic state
6   logic program structure and said. context switch and
7   controller block.

1   4.   The   system   for   effectuating   at   least   one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 3, wherein at least one of said generic
5   state logic program structure and said context switch and
6   controller block is implemented as a field programmable
7   gate array.

1   5.   The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 3, wherein at least one of said generic
5   state logic program structure and said context switch and
6   controller block is implemented as a programmable logic
7   device.

1   6.   The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 3, wherein at least one of said generic
5   state logic program structure and said context switch and
6   controller block is implemented as an application
7   specific integrated circuit.

1   7.   The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 3, wherein at least one of said generic
5   state logic program structure and said context switch and
6   controller block is implemented as a device selected from
7   the group consisting of a field programmable gate array,
8   a programmable logic device, an application specific
9   integrated circuit, an embedded processor and a general
10 purpose processor.

1   8. The system for effectuating at least one

2 protocol layer of a protocol stack operable to implement

3 a high speed communication link at a network node as set

4 forth in claim 7, wherein said generic state logic

5 program structure is personalizable as a Message Transfer

6 Part-Level 3 (MTP-3) queue control state machine based on

7 said state-specific context information in said context

8 storage area.

1   9. The system for effectuating at least one

2 protocol layer of a protocol stack operable to implement

3 a high speed communication link at a network node as set

4 forth in claim 7, wherein said generic state logic

5 program structure is personalizable as a Service Specific

6 Coordination Function (SSCF) control state machine based

7 on said state-specific context information in said

8 context storage area.

1   10. The system for effectuating at least one

2 protocol layer of a protocol stack operable to implement

3 a high speed communication link at a network node as set

4 forth in claim 7, wherein said generic state logic

5 program structure is personalizable as an Asynchronous

6 Transfer Mode (ATM) Adaptation Layer (AAL) control state

7 machine based on said state-specific context information

8 in said context storage area.

1   11. The system for effectuating at least one

2 protocol layer of a protocol stack operable to implement

3 a high speed communication link at a network node as set

4 forth in claim 7, wherein said generic state logic

5 program structure is personalizable as an ATM queue

6 control state machine based on said state-specific

7 context information in said context storage area.

1   12. The system for effectuating at least one

2 protocol layer of a protocol stack operable to implement

3 a high speed communication link at a network node as set

4 forth in claim 7, wherein said generic state logic

5 program structure is personalizable as an ATM control

6 state machine based on said state-specific context

7 information in said context storage area.

1   13. The system for effectuating at least one

2 protocol layer of a protocol stack operable to implement

3 a high speed communication link at a network node as set

4 forth in claim 7, wherein said generic state logic

5 program structure is personalizable as a Service Specific

6 Connection Oriented Protocol (SSCOP) control state

7 machine based on said state-specific context information

8 in said context storage area.

1   14. The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 7, wherein said generic state logic
5   program structure is personalizable as a Traffic Metering
6   and Measurement (TMM) control state machine based on said
7   state-specific context information in said context
8   storage area.

1   15. The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 7, wherein said generic state logic
5   program structure is personalizable as a Timer control
6   state machine based on said state-specific context
7   information in said context storage area.

1   16. The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 7, wherein said generic state logic
5   program structure is personalizable as a state machine
6   operating to transfer SSCOP layer data based on said
7   state-specific context information in said context
8   storage area.

1   17. The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 7, wherein said generic state logic
5   program structure is personalizable as a state machine
6   operating to transfer SSCF layer data based on said
7   state-specific context information in said context
8   storage area.

1   18. The system for effectuating at least one
2   protocol layer of a protocol stack operable to implement
3   a high speed communication link at a network node as set
4   forth in claim 7, wherein said generic state logic
5   program structure is personalizable as a state machine
6   operating to transfer AAL layer data based on said state-
7   specific context information in said context storage
8   area.

1   19. A system for implementing a high speed link

2   (HSL) protocol stack having a plurality of protocol

3   layers at an application node disposed in a network,

4   comprising:

5   a link data processor for coordinating cell

6   assembly and disassembly operations with respect to

7   traffic flowing into and out of said application node;

8   a link control processor coupled to said link

9   data processor via an inter-device interface, said link

10   control processor operating to maintain link states for

11   control portions of at least one of said protocol layers

12   by utilizing a personalizable generic state processing

13   architecture;

14   a data transfer controller coupled said link

15   control processor via another inter-device interface for

16   controlling burst transfers of signal units (SUs) between

17   a host memory provided for said application node and a

18   local cell memory associated with said link data

19   processor; and

20   a context memory block disposed between said

21   link control processor and said data transfer controller

22   for storing state-specific context information based on

23   a service access point (SAP) and a connection identifier

24   (CID) associated with at least one of said protocol stack

25   layers across at least one active connection maintained

26   by said application node in said network, said context

27   information   for   personalizing   said   generic   state

28   processing architecture to effectuate functionality of a

29   select protocol stack layer.

1   20. The system for implementing an HSL protocol

2   stack having a plurality of protocol layers at an

3   application node disposed in a network as set forth in

4   claim 19, further comprising an error reporting block

5   having a serial interface at least for reporting physical

6   errors including at least one of a memory parity error,

7   queue overflow error and an inter-device interface error.

1   21. The system for implementing an HSL protocol

2   stack having a plurality of protocol layers at an

3   application node disposed in a network as set forth in

4   claim 19, wherein at least one of said link data

5   processor, said link control processor and said data

6   transfer controller is implemented as a device selected

7   from the group consisting of a field programmable gate

8   array, a programmable logic device, an application

9   specific integrated circuit, an embedded processor and a

10   general purpose processor.

1   22. The system for implementing an HSL protocol

2 stack having a plurality of protocol layers at an

3 application node disposed in a network as set forth in

4 claim 21, wherein said select protocol stack layer

5 comprises a Message Transfer Part-Level 3 (MTP-3) layer.

1   23. The system for implementing an HSL protocol

2 stack having a plurality of protocol layers at an

3 application node disposed in a network as set forth in

4 claim 21, wherein said select protocol stack layer

5 comprises a Service Specific Coordination Function (SSCF)

6 layer.

1   24. The system for implementing an HSL protocol

2 stack having a plurality of protocol layers at an

3 application node disposed in a network as set forth in

4 claim 21, wherein said select protocol stack layer

5 comprises a Service Specific Connection Oriented Protocol

6 (SSCOP) layer.

1   25. The system for implementing an HSL protocol
2 stack having a plurality of protocol layers at an
3 application node disposed in a network as set forth in
4 claim 21, wherein said select protocol stack layer
5 comprises an Asynchronous Transfer Mode (ATM) Adaptation
6 Layer (AAL).

1   26. The system for implementing an HSL protocol
2 stack having a plurality of protocol layers at an
3 application node disposed in a network as set forth in
4 claim 19, wherein said link data processor and said link
5 control processor are integrated into a single block.

1   27. A method for effectuating a layer service in a

2   protocol stack operable to implement a high speed

3   communication link at a network node, comprising the

4   steps of:

5   receiving, at a context switching system, an

6   input event for said layer service from a service user

7   layer;

8   retrieving, by said context switching system,

9   state-specific context information from a context memory

10 based on a service access point (SAP) and a connection

11 identifier (CID) relating to said input event;

12   processing at least a portion of said input

13 event by a generic state machine (GSM) logic structure

14 personalized by said state-specific context information;

15   generating, by said personalized GSM logic

16 structure, next-state information and at least an output

17 event vector including SAP/CID information for

18 identifying at least one service user destination; and

19   storing said next-state information in said

20 context memory based on said SAP/CID information provided

21 in said input event.

1   28. The method for effectuating a layer service in
2   a protocol stack operable to implement a high speed
3   communication link at a network node as set forth in
4   claim 27, wherein at least one of said GSM logic
5   structure and said context switching system is
6   implemented as a device selected from the group
7   consisting of a field programmable gate array, a
8   programmable logic device, an application specific
9   integrated circuit, an embedded processor and a general
10   purpose processor.

1   29. The method for effectuating a layer service in
2   a protocol stack operable to implement a high speed
3   communication link at a network node as set forth in
4   claim 28, wherein said GSM logic structure is
5   personalized as a Message Transfer Part-Level 3 (MTP-3)
6   queue control state machine based on said state-specific
7   context information retrieved from said context memory.

1   30. The method for effectuating a layer service in
2   a protocol stack operable to implement a high speed
3   communication link at a network node as set forth in
4   claim 28, wherein said GSM logic structure is
5   personalized as a Service Specific Coordination Function
6   (SSCF) control state machine based on said state-specific
7   context information retrieved from said context memory.

1   31. The method for effectuating a layer service in
2   a protocol stack operable to implement a high speed
3   communication link at a network node as set forth in
4   claim 28, wherein said GSM logic structure is
5   personalized as a Service Specific Connection Oriented
6   Protocol (SSCOP) control state machine based on said
7   state-specific context information retrieved from said
8   context memory.

1   32. The method for effectuating a layer service in
2   a protocol stack operable to implement a high speed
3   communication link at a network node as set forth in
4   claim 28, wherein said GSM logic structure is
5   personalized as an Asynchronous Transfer Mode (ATM)
6   Adaptation Layer (AAL) control state machine based on
7   said state-specific context information retrieved from
8   said context memory.

1   33. The method for effectuating a layer service in
2   a protocol stack operable to implement a high speed
3   communication link at a network node as set forth in
4   claim 28, wherein said GSM logic structure is
5   personalized as an ATM control state machine based on
6   said state-specific context information retrieved from
7   said context memory.